

IN THE CLAIMS

Please amend claims 44 and 45 as follows:

Sub E1
1. (Previously Amended) A head suspension for supporting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly radially over a surface of the disc, the head suspension comprising:

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a gimbal portion for mounting the head assembly and providing compliance in roll and pitch axes of the head assembly;

a load beam portion for exerting a load force on the head assembly relative to a load point and the gimbal portion supporting the head assembly to roll about a roll axis; and

means for controlling roll attitude of the head assembly based upon a radial position of the head assembly in relation to the disc.

2. (Previously canceled)

3. (Previously Amended) A disc drive comprising:

a rotating disc mounted for rotation in the disc drive;
a head assembly for recording digital information to and retrieving information from the disc;

a head suspension including a load portion adapted to supply a load force to the head assembly at a load point and a gimbal portion to allow the head assembly to pitch and roll relative to the load point;

an actuator coupled to the head suspension to move the head assembly radially relative to the disc; and

means for dynamically controlling roll attitude of the head

assembly.

4. (Previously Canceled)

5. (Previously Canceled)

6. (Previously Canceled)

7. (Previously Amended) A head suspension for mounting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly radially over a surface of the disc, the head suspension comprising:

a load beam portion for exerting a load force on the head assembly relative to a load point;

a gimbal portion having the head assembly coupled thereto to allow the head assembly to pitch and roll relative to the load point and the gimbal portion including opposed spaced gimbal beams on opposed sides of the load point; and

a plurality of bending assemblies including a first bending assembly coupled to one of said gimbal beams and a second bending assembly coupled to another of said gimbal beams and the first and second bending assemblies being energizable to adjust pitch and roll attitudes of the head assembly.

8. (Previously Amended) A head suspension as claimed in claim 7, wherein the first bending assembly includes a first bending element energizable via a first electrical interface coupled to the first bending element and the second bending assembly includes a second bending element energizable via a second electrical interface coupled to the second bending element to

Sub E17
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Independently energize the first and second bending elements to adjust the roll attitude of the head assembly.

9. (Previously Amended) A head suspension as claimed in claim 7, wherein:

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the first bending assembly includes a first bending element on the one of said gimbal beams and the second bending assembly includes a second bending element on the other of said gimbal beams and the first and second bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion.

10. (Previously Canceled)

11. (Previously Amended) A head assembly as claimed in claim 7 wherein: the plurality of bending assemblies include a bending element formed of a piezoelectric material.

12. (Previously Amended) A head suspension as claimed in claim 7, wherein:

the first bending assembly includes a first bending element on the one of said gimbal beams and the second bending assembly includes a second bending element on the other of said gimbal beams and the first and second bending elements have an elongated length extending along an elongated length portion of the gimbal beams.

13. (Previously Canceled)

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14. (Previously Amended) A head suspension as claimed in claim 8, wherein the first and second bending elements include opposed leading and trailing ends and the first and second electrical interfaces include opposed leads coupled proximate to the opposed leading and trailing ends of the first and second bending elements.

15. (Previously Canceled)

16. (Previously Amended) A head suspension for mounting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly having a leading edge, a trailing edge and opposed sides radially over a surface of the disc, the head suspension comprising:

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a load beam portion for exerting a load force on the head assembly relative to a load point;

a gimbal portion having the head assembly coupled thereto to allow the leading edge of the head assembly to pitch about a pitch axis and the opposed sides of the head assembly to roll about a roll axis relative to the load point;

the gimbal portion further including a plurality of bending elements including at least one bending element on a first side of the roll axis and at least one bending element on a second opposed side of the roll axis actuatable to adjust a roll attitude of the head assembly relative to the roll axis.

17. (Previously Amended) A head suspension as claim in claim 16, wherein:

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Claim 1
the plurality of bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion or a piezoelectric material.

18. (Previously Amended) A head suspension as claimed in claim 16, wherein:

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the gimbal portion further comprises a pair of longitudinally extending gimbal beams and a connecting cross member between distal ends of the pair of gimbal beams; and

the plurality of bending elements are mounted on the connecting cross member.

19. (Previously Canceled)

20. (Previously Amended) A head suspension as claimed in claim 16, wherein:

the gimbal portion further comprises a pair of longitudinally extending gimbal beams; and
the plurality of bending elements are mounted on the pair of gimbal beams.

21. (Previously Amended) A head suspension as claimed in claim 16, wherein:

a first electrical interface is coupled to the at least one bending element on the first side of the roll axis and a second electrical interface is coupled to the at least one bending element on the second opposed side of the roll axis to independently energize the first and second bending elements to adjust the roll attitude of

the head.

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22. (Previously Canceled)
23. (Previously Canceled)
24. (Previously Canceled)
25. (Previously Canceled)
26. (Previously Canceled)
27. (Previously Canceled)
28. (Previously Canceled)
29. (Previously Canceled)
30. (Previously Canceled)
31. (Previously Canceled)
32. (Previously Canceled)
33. (Previously Canceled)

34. (Previously Amended) The head suspension assembly of claim 1 wherein the means for controlling roll attitude includes a plurality of bending elements on opposed sides of the roll axis.

35. (Previously Added) The head suspension assembly of claim 34 wherein the plurality of bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion or a piezoelectric material.

36. (Previously Added) The head assembly of claim 34 wherein the plurality of bending elements are independently energized relative to the radial position of the head assembly in relation to the disc.

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37. (Previously Amended) The head assembly of claim 9 wherein the opposed spaced gimbal beams have a different coefficient of thermal expansion than the first and second bending elements to form the bi-metal structure having the different coefficients of thermal expansion.

38. (Previously Amended) The head assembly of claim 7 wherein the first and second bending assemblies are energized based upon a radial position based upon a radial position of the head assembly relative to the disc.

4439. (Currently Amended) A head assembly comprising:

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- a head suspension assembly including a gimbal portion;
 - a head assembly coupled to the gimbal portion to pitch and roll about a pitch axis and a roll axis defined relative to a load point; and
 - a bending assembly including a bending elements spaced from the roll axis and the bending assembly being energizable to adjust a roll attitude of the head assembly relative to the roll axis.

4540. (Currently Amended) The head assembly of claim 4439 wherein ~~the including a plurality of bending assemblies including a first bending assembly including~~ includes a first bending element spaced from the roll axis in a first direction and ~~a second bending assembly including a second bending element spaced from the roll axis in a second direction opposite to the first direction and the first and second bending assemblies being energizable to adjust the roll attitude of the head assembly relative to the roll axis.~~

Please add new claims 41-44 as follows:

41.(New) A method for controlling a roll attitude of a head assembly of a disc drive comprising steps of:

rotating a disc to provide a lifting force to the head assembly; and

energizing a bending element spaced from a roll axis of the head assembly to adjust the roll attitude of the head assembly.

42.(New) The method of claim 39 wherein the step of energizing further comprises energizing a plurality of bending elements to adjust the roll attitude of the head assembly.

43.(New) The method of claim 39 including a first bending element on a first side of the roll axis and a second bending element on a second opposed side of the roll axis and the step of energizing the bending element energizes one of the first or second bending elements.

44.(New) The method of claim 39 including a first bending element on a first side of the roll axis and a second bending element on a second opposed side of the roll axis and the step of energizing the bending element energizes the first and second bending elements.

45.(New) The method of claim 42 wherein the first bending element is energized to bias the head assembly in a first direction and the second bending element is energized to bias the head assembly in a second direction opposite to the first direction to adjust the roll attitude of the head assembly.